

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/41515

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :B66B 1/34, B66B 3/00; G01B 11/14
US CL :356/614; 187/394, 391

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 356/614, 622, 623; 187/394, 391, 130, 131, 135

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST AND WEST SEARCHES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2001/0025746 A1 (BAMMERT) 04 October 2001 (04/10/01), figures 5-6, page 5, left column.	1-5, 7-11, 19-22
X	US 6,427,809 B2 (BAMMERT) 06 August 2002 (06/08/02), figures 3-6, column 8, lines 65-67.	1-5, 7-11, 19-22
A	US 5,004,076 A (CHEN ET AL) 02 April 1991 (02/04/91), figures 1.	1-23
A	US 4,019,606 A (CAPUTO ET AL) 26 April 1977 (26/04/1977), figures 6 and 8.	1-23
A	US 6,305,503 B1 (SUZUKI ET AL) 23 October 2001 (23/10/2001), figures 3 and 4.	1-23

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

24 APRIL 2003

Date of mailing of the international search report

02 SEP 2003

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT

Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

HOA Q. PHAM

Telephone No. (703) 308-4808

Diane Smith